

Application 10/733,664

March 3, 2008 amendment in response to the Office Action dated October 2, 2007

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AAMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of Claims:

1. (currently amended) An open fused silica extraction capillary having an internal solid phase extraction surface that binds a biomolecule, wherein at least some portion of the capillary is coiled.
2. (currently amended) An open fused silica extraction capillary having an internal solid phase extraction surface that binds a group of molecules, wherein at least some portion of the capillary is coiled. The extraction capillary of claim 1, wherein the capillary comprises synthetic fused silica and a polymer coating.
- 3-6. (cancelled)
7. (currently amended) The extraction capillary of claim 2, wherein the group of molecules is a multi-protein complex. ~~polymer coating comprises polyimide.~~
8. (previously presented) The extraction capillary of claim 1, wherein the biomolecule is a protein or a nucleic acid.
9. (currently amended) The extraction capillary of claim 2-4, wherein the group of molecules is a virus or a cell. ~~biomolecule is selected from a group consisting of a multi-protein complex, a multi-protein complex bound to a nucleic acid, a virus, and a cell.~~
10. (original) The extraction capillary of claim 1, wherein the extraction surface comprises an immobilized metal ion.
11. (original) The extraction capillary of claim 1, wherein the extraction surface comprises a protein.
- 12-14. cancelled
15. (currently amended) An open capillary channel device comprising the open fused silica extraction capillary of claim 1, having a first end connected to a pump for pumping liquid

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- and gas, and a second end, the pump being a syringe pump, pressurized container, centrifugal pump or electrokinetic pump.
16. (original) A multiplexed solid phase extraction instrument comprising a plurality of the extraction devices of claim 15 arrayed for the parallel processing of multiple samples.
17. (withdrawn) A method for molecular open tubular solid phase extraction, the method comprising the steps of
- a) adsorbing biomolecules in a sample solution to the extraction surface of a fused silica extraction capillary tubing of claim 1, the capillary tubing having a total capillary volume; and
 - b) desorbing a substantial portion of the biomolecules from the extraction surface with a desorbent liquid passed through the capillary channel.
18. (withdrawn) The method of claim 17, wherein the biomolecules are desorbed with a Tube Enrichment Factor of at least 1.
19. (withdrawn) The method of Claim 17, wherein the direction of passage of the desorption solution through the column reversed during the desorption step.
20. (withdrawn) The method of Claim 17, wherein a wash solution is passed through the capillary channel between steps (a) and (b).
- 21-22. cancelled
23. (withdrawn) The method of Claim 17, wherein the extraction surface has an affinity binding agent bound thereto, and the affinity binding agents is:
- a) a chelated metal having a binding affinity for a biomolecule;
 - b) a protein having a binding affinity for a protein;
 - c) an organic molecule or group having a binding affinity for a protein;
 - d) a sugar having a binding affinity for a protein;
 - e) nucleic acid having a binding affinity for a protein;
 - f) a nucleic acid or a sequence of nucleic acids having a binding affinity for a nucleic acid; or

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- g) a small molecule binding agent having a binding affinity for a small molecule.
24. cancelled
25. (withdrawn) The method of Claim 17, wherein the biomolecules are desorbed with a Tube Enrichment Factor from within a range from 1 to 400.
26. cancelled
27. (withdrawn) The method of claim 17, wherein the biomolecule is a protein or a nucleic acid.
28. (withdrawn) The method of claim 17, wherein the biomolecule is a multi-protein complex or a multi-protein complex bound to a nucleic acid.
29. (withdrawn) The method of claim 17, wherein the biomolecule is a virus or a cell.
30. (new) The open fused silica extraction capillary of claim 1, wherein the capillary is coiled at a bend radius of less than 3 cm.
31. (new) The open fused silica extraction capillary of claim 30, wherein the extraction surface comprises a protein or an immobilized metal ion and the biomolecule is a selected from a group consisting of a protein, a nucleic acid, a multi-protein complex, a virus, and a cell.
32. (new) The open fused silica extraction capillary of claim 31, having a first end connected to a pump for pumping liquid and gas, and a second end, the pump being a syringe pump, pressurized container, centrifugal pump or electrokinetic pump.
33. (new) A multiplexed solid phase extraction instrument comprising a plurality of the extraction devices of claim 32 arrayed for the parallel processing of multiple samples.
34. (new) The open fused silica extraction capillary of claim 8 further comprised of a protein or nucleic acid bound to the internal solid phase extraction surface.
35. (new) The open fused silica extraction capillary of claim 2, wherein the extraction surface comprises a protein, and wherein the extraction capillary is further comprised of a biomolecule bound to the internal solid phase extraction surface, wherein the biomolecule is selected from the group consisting of a multi-protein complex, a virus, and a cell.
36. (new) An open capillary channel device comprising the fused silica extraction capillary of claim 35, having a first end connected to a pump for pumping liquid and gas, and a second

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end, the pump being a syringe pump, pressurized container, centrifugal pump or electrokinetic pump.

37. (new) A multiplexed solid phase extraction instrument comprising a plurality of the extraction devices of claim 36 arrayed for the parallel processing of multiple samples.